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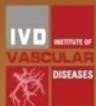
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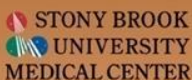
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Alexandroupolis, Greece**

Organized by:



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LIVE 2012 Symposium will be submitted to be approved
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DEVELOPMENT OF A PROGNOSTIC MODEL FOR LOWER LIMB STUMP HEALING



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IMPORTANCE OF STUMP HEALING



BACKGROUND

- Worldwide, one lower limb is amputated every 30 seconds as a consequence of PAD and Diabetes (Boulton et al, 2005).
- Is a major contributor to morbidity and mortality among patients with diabetes mellitus (Hambleton et al, 2009).
- Relevant literature heterogeneous with respect to patient selection, intervention and outcome measures in general and stump healing in particular. (Nawijn et al, 2005).



To explore the role of blood markers and patient factors in the predication of stump healing in major lower limb amputation surgery at the Royal Infirmary of Edinburgh.



METHODOLOGY

- **Research Design**
Retrospective Study
- **Setting/Location of study**
Royal Infirmary of Edinburgh
- **Intervention**
Major Lower Extremity Amputation (LEA)
- **Sample Size**
300 patients who underwent LEA surgery between 2006 and 2009
- **Ethical Approval**
Lothian Research Ethics Committee
Queen Margaret University Ethics Committee.



VARIABLES

Lipid Profile

- High Density Lipoprotein (HDL)
- Triglyceride (TG)
- Total Cholesterol (TC)

Risk Factors

- Gender
- Age
- Peripheral Vascular Disease (PVD)
- Diabetes Mellitus (DM)
- Hypertension (HTN)
- Basal Metabolic Index (BMI)
- Smoking

Kidney Function

- Glomerular Filtration Rate (GFR)
- Serum Potassium (K^+)
- Serum Sodium (Na)
- Blood Urea
- Serum Creatinine

Infection markers

- C-reactive protein
- White cell count
- Wound culture

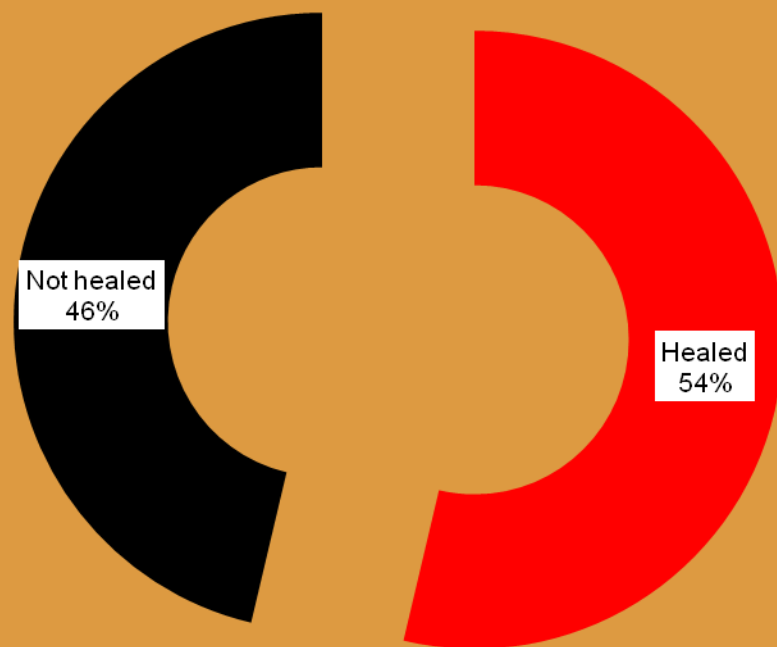
Coagulation Profile

- Prothrombin Time (PT)
- International Normalisation Ratio (INR)

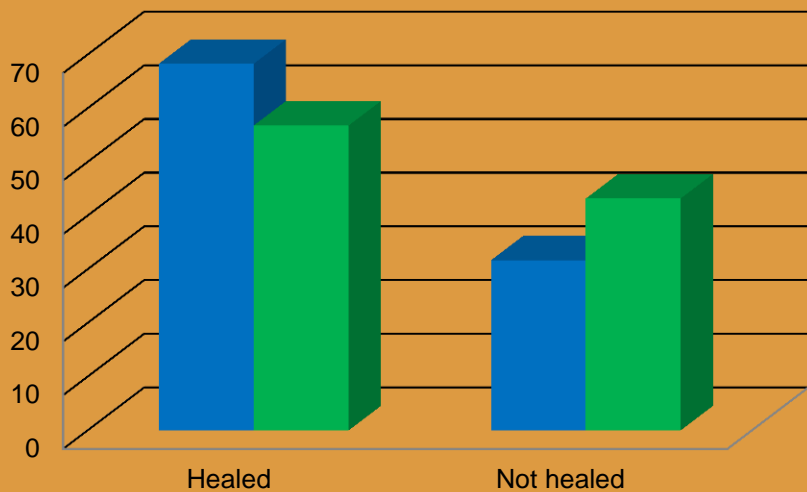


RESULTS

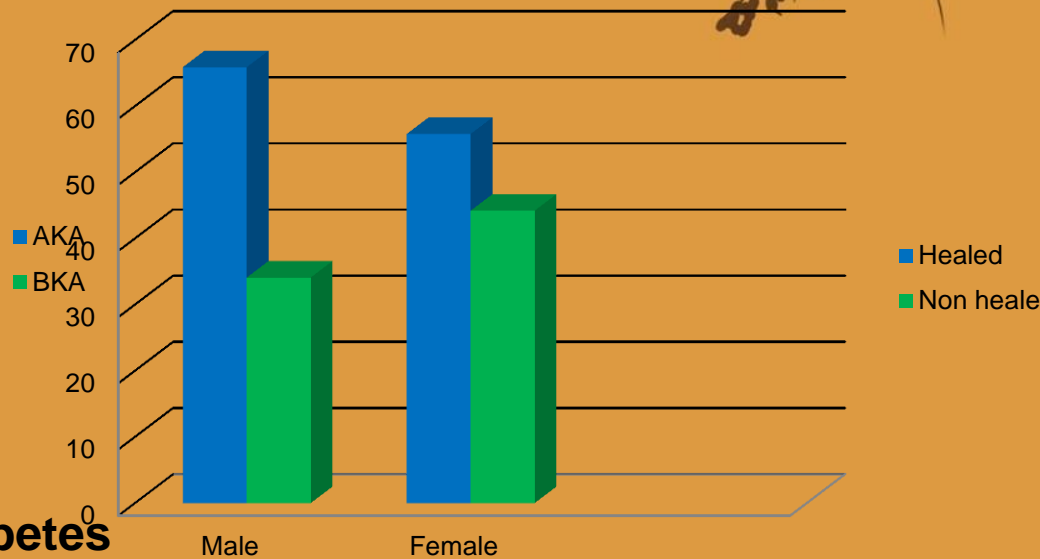
Stump Healing



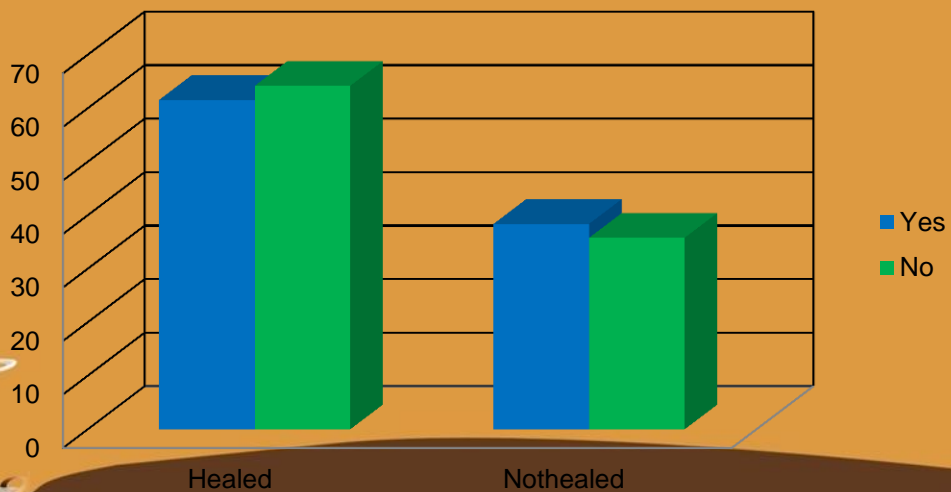
Type of Amputation



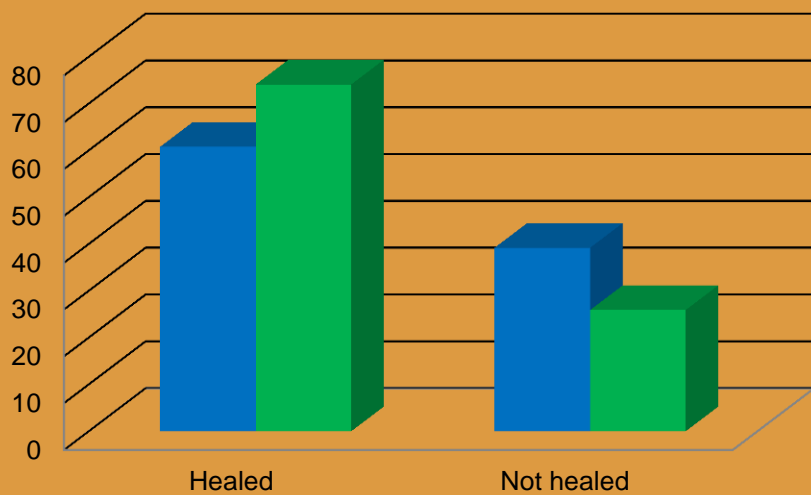
Gender



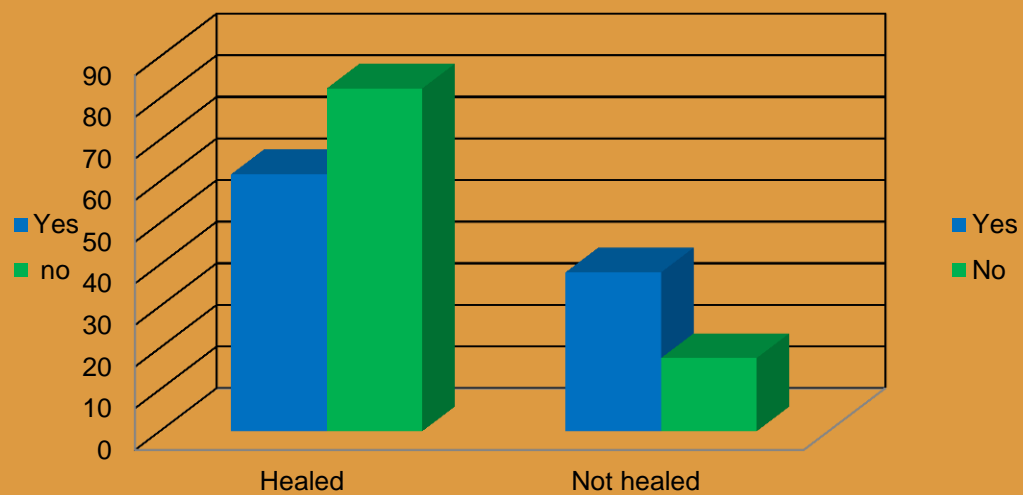
Diabetes



Smoking



Hypertension



Univariate Analysis of independent variables to Lower limb stump healing

CLINICAL CHARACTERISTICS	% STUMP HEALED	TOTAL %	CRUDE OR(95%CL)	P VALUE
Type of Amp			1.638(1.022-2.627)	0.04
AKA	68.3	53.7		
BKA	56.8	46.3		
Age			2.011(0.542-7.470)	0.297
<50	76.9	4.3		
>50	62.4	95.7		
Gender			1.529(0.971-2.549)	0.103
Male	65.9	71.3		
Female	55.8	28.7		
DM			0.894(0.559-1.431)	0.642
YES	61.6	46		
NO	64.2	54		
HTN			0.347(0.098-1.236)	0.103
YES	61.8	94.3		
NO	82.4	5.7		

CLINICAL CHARACTERISTICS	% STUMP HEALED	TOTAL %	CRUDE OR(95%CL)	P VALUE
SMOKING			0.543(0.281-1/052)	0.19
YES	60.8	81.7		
NO	74.1	18.3		
SODIUM			1.711(1.039-2.818)	0.035
Normal	67	68.7		
Abnormal	54.3	31.3		
POTASSIUM			0.922(0.48-1.756)	0.804
Normal	62.7	84		
Abnormal	64.6	16		
UREA			0.929(0.577-1.496)	0.762
≤6.6	62.3	58.3		
>6.6	64	41.7		



CLINICAL CHARACTERISTICS	% STUMP HEALED	TOTAL %	CRUDE OR(95%CL)	P VALUE
CREATININE			1.592(0.920-2.755)	0.0977
≤120	65.5	77.3		
>120	54.4	22.7		
CRP			0.890(0.308-2.571)	0.829
≤5	60	5.1		
>5	62.8	94.9		
WCC			1.031(0.639-1.665)	0.9
Normal	63.6	40.5		
Abnormal	62.9	59.5		
PT			0.944(0.587-1.517)	0.811
≤13.5	62.4	57.7		
>13.5	63.8	42.3		

CLINICAL CHARACTERISTICS	% STUMP HEALED	TOTAL %	CRUDE OR(95%CL)	P VALUE
INR			1.236(0.789-2.041)	0.407
≤1.2	64.6	68.7		
>1.3	59.6	31.3		
TC			1.407(0.743-2.664)	0.294
≤5	64.7	84.4		
>5	56.5	15.6		
TG			0.858(0.453-1.625)	0.638
≤2.1	63.2	82.4		
>2.1	66.7	17.6		
HDL			1.617(0.991-2.640)	0.054
≤1.1	68	61.6		
>1.1	56.8	38.4		

Multivariable Predictors of Lower limb stump healing

PREDICTIVE VARIABLE	ODD RATIO	95% CI	p value
Se Na	1.756	1.048-2.942	0.031
Se Creatinine	1.664	0.940-2.946	0.060
HDL	1.753	1.061-2.895	0.026

SCORING

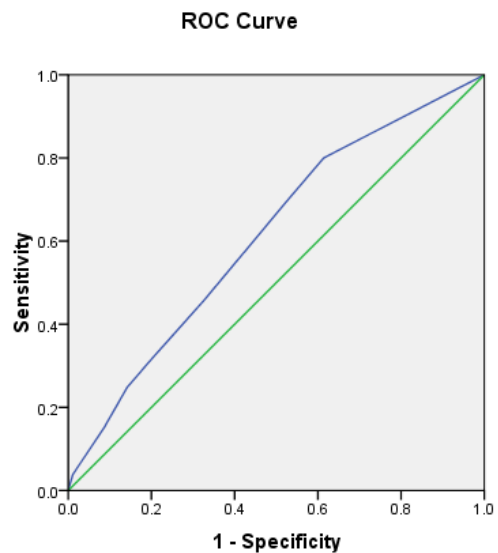
Clinical Characteristic	Beta coefficient	Error of significance	Zscore	Adjusted score
Na	0.563	0.263	3.8	4
Creatinine	0.509	0.291	1.75	2
HDL	0.561	0.256	2.19	2

Clinically user friendly predictive model

-log odds of failure of stump healing $[\log / (1/1 - P)] = -1.82 + (-0.563 \times \text{Se Na}) + (0.509 \times \text{Se Creatinine}) + (0.561 \times \text{HDL})$

Hosmer and Lemeshow Test

Step	Chi-square	Df	Sig
1	1.194	4	0.879



Diagonal segments are produced by ties.

Area under the curve OR C index	Sensitivity	Specificity	Positive Predictive value	Negative Predictive value
0.621	15.2	91.3	50%	65%

The area under the ROC is 0.621, which is indicating 62% ability to discriminate between patients with stump healing.

CONCLUSION

- Abnormal Serum Sodium, Serum Creatinine and High Density Lipids are useful predictors of lower limb stump healing.
- The clinical significance of these risk categories in the lower limb stump healing requires further clinical evaluation.



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